If you missed part one of this article, you will find it at www.DeepBleaching.com/articles

Part Two

Why Is Bleaching So Gosh-Darn FRUSTRATING?!!

(except for Deep Bleaching™ of course)

by Dr. Rod Kurthy

In part one (found at www.DeepBleaching.com/articles) I discussed WHY typical bleaching results have been so very unpredictable and WHY Deep Bleaching has been able to overcome these issues, resulting in highly predictable and amazingly effective results – PERMANENT results. So let's pick up where we left off.

Now that your patient has worn the precise Deep Bleaching™ Trays at home, which seal in bleach and seal out saliva – allowing hours of continuous oxygen release – the next step is the final in-office bleaching visit.

After use of at-home Deep Bleaching Trays, the affect of the higher concentration hydrogen peroxide gels on teeth is MUCH different than a one-visit in-office session. Remember, at this point the teeth have not only been whitened more than you've ever seen before, but the tooth structure has been "conditioned" and WILL actually ABSORB that high concentration of oxygen radicals being given off. The result?? BAM!! WOW!!! You're now taking teeth that have already become quite white, and you're kicking them up a few MORE notches in whiteness!

You've heard dentists talk about the remarkable results of Deep Bleaching, and you've likely seen the photos posted by "in-the-trenches" dentists on various dental Internet forums. NOW you understand WHY they can get teeth so beautifully white – even tetracycline stained teeth.

In part one I promised to discuss bleaching sensitivity, so let's get to it.

Dentists see sensitivity in a large percentage of bleaching cases, but luckily this sensitivity is only transient, with no pathological pulpal changes having been found.

To understand why bleaching sensitivity occurs, you need to understand the currently accepted hypothesis of dentinal hypersensitivity (DH), referred to as a hydrodynamic mechanism. This theory states that a stimulus (thermal, mechanical, evaporative, osmotic or chemical) applied to dentin causing flow of dentinal tubular fluid (inward or outward) will mechanically activate the nerves situated at the inner ends of the tubules or in the outer layers of the pulp, causing a painful reaction.

There are ONLY TWO WAYS to eliminate sensitivity. First, prevent flow of tubular fluid, or second, numb the nerve (prevent the firing of impulses by the pulpal neurons).

In part one of this article, I discussed how bleaching gel gets down in-between clusters of enamel rods that have separated due to the deformation of dentin during function. It is my belief that those scrubbing bubbles I discussed that clean out the micro-debris will also remove the plugs in dentinal tubules (fig 1).

A dentinal tubule that has lost its orifice plug will have tubular fluid that flows inward or outward a whopping 32-times more freely than when a plug has closed the orifice of the tubule. Obviously, we want to see these tubules remain plugged, or re-plugged.

Many say that sensitivity is caused by dehydration, and in a very technical sense, this is partially true. However, it's not exactly what it sounds like.

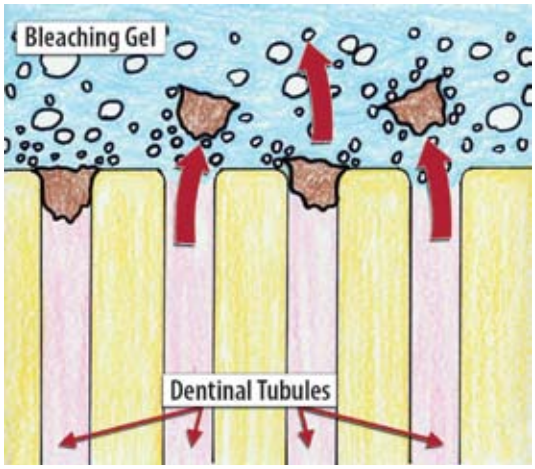

Fig. 1 Oxygenating bleaching gels that remove the micro-debris within tooth structure will also remove the plugs in dentinal tubules.

When I do my clinical testing, I do split-arch testing. You can't get more accurate than that. We perform one process on one side of the patient's mouth, and something different on the other side (usually one side is a control). It's very easy to see the visual difference from right side to left, and as far as sensitivity, it is easy for the patient to tell us how they feel on one side compared to the other.

We have intentionally performed split-arch testing where we have dehydrated one side of the mouth and not the other. No sensitivity was found simply due to dehydration.

I believe it is more of an osmotic gradient created between the tubular fluid and bleaching gel, causing fluid flow. By removing water from tubular fluid (through osmosis), yes you are technically dehydrating, but the actual effect causing the sensitivity would be osmosis.

I will talk later about anhydrous vs. aqueous bleaching gels and their affects on sensitivity, but first let's talk about blocking sensitivity in general.

There has been talk about potassium nitrate regarding reduction of bleaching sensitivity. In other words, use of toothpastes containing potassium nitrate for a couple weeks prior to bleaching and during bleaching.

Contrary to popular belief, potassium nitrate does NOT plug the dentinal tubules. It simply migrates down the tubules into the pulp (which can take several days) and reduces the ability of pulpal neurons to fire – virtually "numbing" the pulp to a degree. When and if you have a patient that you suspect is more susceptible to bleaching sensitivity, this is an excellent additional step to reduce sensitivity. Just be certain NOT to use toothpaste that also contains pyrophosphate tartar control, as many (myself included) believe pyrophosphate to be a pulpal irritant.

The downside of potassium nitrate is that it adds more steps and time for your patient, and we all know at-home compliance is a frequent obstacle. I'd personally rather PREVENT the cause of sensitivity than simply numb the nerve. For me, potassium nitrate is not my primary weapon against sensitivity, but can be a valuable ADDITIONAL tool in some cases.

Obviously, our first line of defense against sensitivity is to plug the dentinal tubules. The Deep Bleaching™ System has incorporated both an inorganic (oxalate) and organic (HEMA/fluoride) method of plugging dentinal tubules. These products are used during in-office bleaching sessions, and by the patients daily at home during bleaching.

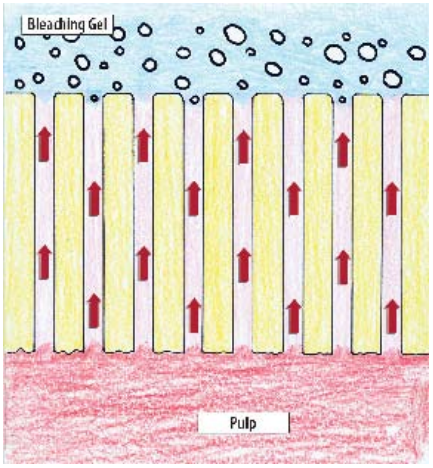

Fig. 2 Fluid movement within dentinal tubules is responsible for pulpal sensitivity. The direction of fluid movement within dentinal tubules caused by osmosis from bleaching gel is outward, away from the pulp.

Our clinical split-arch studies confirmed that two of every three test patients felt virtually no sensitivity on our test side (with use of the two desensitizers mentioned above), compared to the typical bleaching sensitivity felt on the opposite side where two of the most popular bleaching systems were used.

Of the few patients who DID indicate they felt SOME level of sensitivity on the test side, when interviewing these patients and asking them to compare the AMOUNT of sensitivity felt on the test side compared to the control side, no patient stated more than 10%. In other words, patients indicated that they felt no more sensitivity than 10% on the test side, compared to what they felt on the opposing side where one of two popular bleaching brands/systems were used.

Contrary to what you may now be thinking, this does not mean that you will never again deal with complaints of sensitivity. Remember, a very few patients have intense pain even upon use of only three minutes of an over-the-counter whitening strip. In these super-sensitive patients, even after reducing their sensitivity by 90%, longer periods of whitening may still cause some sensitivity.

Obviously there is a tremendous reduction of sensitivity problems with this approach, but a rare few may still have sensitivity. But take heart, my desensitizing research and development of even this small occurrence of sensitivity continues as I write this article.

What about adding things like potassium nitrate (PN) and fluoride to bleaching gels themselves? Will that really help? The direction of fluid movement in the dentinal tubules caused by osmosis from bleaching gel is outward, away from the pulp (fig. 2). Potassium nitrate trying to get up into the pulp would be like trying to swim upstream against the current. And fluoride is dependant on calcium to precipitate calcium fluoride. With bleaching gel against the tooth, where will the calcium come from, and will the agitation of the oxygen prevent this precipitation? I do not see the logic (other than a marketing spin) of adding fluoride and potassium nitrate to the bleaching gel – I prefer to use these desensitizers separately – not mixed inside the bleaching gel.

Over the past year I've had many ask me, "Rod, I've noticed over the past few years that we see a bit less sensitivity with most companies' gels, but also our results are not as good as they used to be. Why?"

Most have heard by now that the anhydrous bleaching gels cause more sensitivity than the water based (aqueous) gels. The anhydrous gels tend to dehydrate the tubules, resulting in an osmotic effect and fluid movement – therefore sensitivity. Anhydrous gels are easier and less expensive for bleaching companies to deal with – the shelf life is longer and they're much less sensitive to high temperature. But because of the sensitivity issue, bleaching companies have been pressured to make their gels water based.

Making water based gels more acidic lengthens the shelf life, but we dentists obviously don't want acidic gels. With aqueous gels being MUCH more prone to degradation, it's my belief that the negative affect of temperature on these gels is responsible for the reports of decreased effectiveness over the last several years.

Consider the following potential scenario – the factory makes the gel and stores it in a warm warehouse. When they get an order from the bleaching product company, they ship to the bleaching product company in freight trucks for several days where the temperatures in the trucks often far exceed 125°F! The bleaching product company then stores the gels in their warm warehouse until you order it. It is then shipped to you, again in very hot trucks (such as UPS). By this time, these aqueous gels have degenerated a significant amount before you even receive them – their effectiveness has been reduced.

Deep Bleaching's Evolve Dental Technologies [www.DeepBleaching.com (866) 763-7753] is the first and only company to refrigerate all bleaching gels every second from the instant of manufacture until you receive them in your practice. Using this approach, fully aqueous gels are provided at an absolutely neutral pH and STILL provide a long shelf life; and more importantly, you receive gels that are at virtually 100% of their original effectiveness.

I hope this article has been helpful and answered many of those nagging questions about the frustrations of bleaching.